UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,493	06/03/2005	Hiroshi Horiuchi	Q88366	4639

65565 7590 08/06/2010

SUGHRUE-265550
2100 PENNSYLVANIA AVE. NW
WASHINGTON, DC 20037-3213

EXAMINER	
BADR, HAMID R	

ART UNIT	PAPER NUMBER
1781	

NOTIFICATION DATE	DELIVERY MODE
08/06/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

SUGHRUE265550@SUGHRUE.COM
USPTO@SUGHRUE.COM
PPROCESSING@SUGHRUE.COM

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/537,493
Filing Date: June 03, 2005
Appellant(s): HORIUCHI ET AL.

Sunhee Lee and Yan Lan
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 5/18/2010 appealing from the Office action mailed 01/06/2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The Examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 5, 6, 8-12, 14 and 15

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner substantially agrees with the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (over Badr et al. 2001; and Holland et al. 1987, both as evidentiary references) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

Castberg et al.	US 5,453,286	Sep. 26, 1995
Kamiya et al.	EP 1 082 907	Mar. 14, 2001
Zindel et al.	WO/2002/024870	Mar. 28, 2002

Holland, K. T. et al. Tertiary Level Biology; Anearobic Bacteria. Chapman & Hall, New York. 1987 (Evidentiary Reference; New ground of rejection)

Badr, H. R. et al. 2001. Continuous acetone-ethanol-butanol fermentation by immobilized cells of *Clostridium acetobutylicum*. Biomass and Bioenergy. 20:119-132. (Evidentiary reference; New ground of rejection)

Note: US 2003/0096037A1 is the English equivalent of WO/2002/024870 which became available at the time of writing this script.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 5-6, 8-12, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Castberg et al. (US 5,453,286; hereinafter R1) in view of Kamiya (EP 1 082 907; hereinafter R2).

2. R1 discloses a method of converting pasteurized milk into fermented milk in which the pasteurized milk is high temperature heat treated and carbonated with carbon dioxide and inoculated with starter culture followed by fermentation of the inoculated milk. (Abstract).

3. R1 discloses that while the conventional yoghurt process employs 43C as the incubation temperature; an incubation temperature of 30C can be used (Col. 3, lines 14-17).

4. R1 discloses the advantage of the invention as shortening the fermentation time necessary and can thus lead to economies of the fermented milk and is particularly applicable to yoghurt production (Col. 4, lines 29-34). Therefore, the fermentation period is shorter compared to a fermentation period without using the inert gas. A shorter fermentation period is presently claimed.

5. R1 discloses that the stimulation of lactic bacterial growth is, in part, due to removal of oxygen from the milk and thus lowering the redox potential. (col. 4, lines 40-43). R1 further adds that high oxygen content (e. g. in milk) retards the growth of yoghurt bacteria. (col. 4, lines 48-50) . It is then obvious that using an inert gas to remove oxygen from the medium will make the medium more favorable for growth of yogurt bacteria.

6. R1 discloses that the high temperature heat treatment of milk can be at 80-85C for 20-30 minutes or at 90-95C for 3minutes. (col. 3, lines 10-15)

7. R1 discloses a method of converting milk into fermented milk comprising supplying heat treated milk, introducing the carbon dioxide into the heat treated milk and introducing the starter culture into the milk to instigate fermentation of milk. (col. 3, line 67 to col. 4 line 6, Examples 1 and 4).

8. Given the order of steps of sterilization, gasification, and fermentation of the yogurt substrate, as disclosed by R1, steps of claim 15 would be obvious to an artisan.

9. R1 teaches using 1200 ppm of carbon dioxide which stimulates the starter culture and as a result the incubation time is reduced by 20% (Col. 5, lines 5-10). Given the effect of lowering the oxygen content of the medium (col. 4, lines 40-43) on the starter culture growth and the consequent reduction of the incubation time, the finding, by the applicant, that an increase of the lactic acid activity could be promoted without using any additives such as fermentation promoting substances by using inert gas to reduce the dissolved oxygen concentration (Page 5 of the instant application, lines 10-21) was known in the art at the time the invention was made.

10. R1 gives an incubation temperature of 37C while using yoghurt starter cultures (Col. 8, Example IV)

11. R1 discloses that the stimulation of lactic bacterial growth is, in part, due to removal of oxygen from the milk, thus the lowered redox potential, disclosed by R1, is an indication of oxygen removal. However, R1 does not directly address the dissolved oxygen concentration and to what level it should be adjusted to.

12. R2 teaches of using nitrogen to reduce the dissolved oxygen in milk. R2 teaches that in milk; the dissolved oxygen is about 10 ppm and in order to reduce it to about 2 ppm; one needs to add 40-50%, by volume, of nitrogen gas to the amount of milk (page 4, p 0023). Once this information is disclosed; artisans can reduce the dissolved oxygen in the fermentation medium to any level suitable for the growth of yogurt bacteria. Therefore, the problem to be solved would be optimizing the dissolved oxygen levels in the medium and observing its effect on kinetics of bacterial growth. All other factors being kept constant, determination of a few data points below the normal 10 ppm oxygen level in milk and the effect of reduced oxygen level on yogurt bacterial growth would have been well within the skill of the art.

13. It is noted that due to solubility of carbon dioxide in aqueous media, a change of pH of the medium can be resulted depending on the duration and temperature at which gasification is carried out. Therefore, in order to avoid the possible pH change, one of ordinary skill in the art would be motivated to replace carbon dioxide with nitrogen gas and expect to reduce dissolved oxygen in the medium to make the medium more favorable for yogurt bacterial growth.

14. Regarding claims 8-9, given that R1 in combination with R2 disclose method as presently claimed, it is clear that such method would intrinsically result in fermented milk with excellent smoothness and taste as presently claimed as well as hardness as presently claimed.

15. Regarding claims 10-12; it is clear that the method as disclosed by R1 and R2, would intrinsically result in fermented milk with penetration angle and hardness as presently claimed. The hardness and penetration angle, as presently claimed, are describing the textural characteristics of the yogurt product. In fact hardness and penetration angle as claimed are the results of testing certain textural characteristics of the yogurt gel. They do not add to the patentability of the invention per se.

16. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the teachings of R1 and adopt the teachings of R2 in using nitrogen to reduce the dissolved oxygen in the milk medium to accelerate the growth of the starter culture and hence reduce the incubation time as taught by R1 and as presently claimed. One would do so to benefit from processes which may be carried out on a continuous basis and having a shorter fermentation time, and to improve the overall economics of the process while using a gas such as nitrogen which does not affect organoleptic properties of the product. Absent any evidence to contrary and based on the combined teachings of the cited references, there would be a reasonable expectation of success in making a fermented product using nitrogen gas for displacing dissolved oxygen from the fermentation medium.

1. Claims 5-6, 8-12, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Castberg et al. (US 5,453,286; hereinafter R1) in view of WO-0224870 (Examiner's Translation, hereinafter R3; English equivalent of this document is US 2003/0096037A1 which became available at the writing of this script).

17. R1 discloses a method of converting pasteurized milk into fermented milk in which the pasteurized milk is high temperature heat treated and carbonated with carbon dioxide and inoculated with starter culture followed by fermentation of the inoculated milk. (Abstract).

18. R1 discloses that while the conventional yoghurt process employs 43C as the incubation temperature; an incubation temperature of 30C can be used (Col. 3, lines 14-17).

19. R1 discloses the advantage of the invention as shortening the fermentation time necessary and can thus lead to economies of the fermented milk and is particularly applicable to yoghurt production (Col. 4, lines 29-34). Therefore, the fermentation period is shorter compared to a fermentation period without using the inert gas. A shorter fermentation period is presently claimed.

20. R1 discloses that the stimulation of lactic bacterial growth is, in part, due to removal of oxygen from the milk and thus lowering the redox potential. (col. 4, lines 40-43). R1 further adds that high oxygen content (e. g. in milk) retards the growth of yoghurt bacteria. (col. 4, lines 48-50) . It is then obvious that using an inert gas to remove oxygen from the medium will make the medium more favorable for growth of yogurt bacteria.

21. R1 discloses that the high temperature heat treatment of milk can be at 80-85C for 20-30 minutes or at 90-95C for 3minutes. (col. 3, lines 10-15)

22. R1 discloses a method of converting milk into fermented milk comprising supplying heat treated milk, introducing the carbon dioxide into the heat treated milk and introducing the starter culture into the milk to instigate fermentation of milk. (col. 3, line 67 to col. 4 line 6, Examples 1 and 4).

23. Given the order of steps of sterilization, gasification, and fermentation of the yogurt substrate, as disclosed by R1, steps of claim 15 would be obvious to an artisan.

24. R1 teaches using 1200 ppm of carbon dioxide which stimulates the starter culture and as a result the incubation time is reduced by 20% (Col. 5, lines 5-10). Given the effect of lowering the oxygen content of the medium (col. 4, lines 40-43) on the starter culture growth and the consequent reduction of the incubation time, the finding, by the applicant, that an increase of the lactic acid activity could be promoted without using any additives such as fermentation promoting substances by using inert gas to reduce the dissolved oxygen concentration (Page 5 of the instant application, lines 10-21) was known in the art at the time the invention was made.

25. R1 gives an incubation temperature of 37C while using yoghurt starter cultures (Col. 8, Example IV)

26. R1 discloses that the stimulation of lactic bacterial growth is, in part, due to removal of oxygen from the milk, thus the lowered redox potential, disclosed by R1, is an indication of oxygen removal. However, R1 does not directly address the dissolved oxygen concentration and to what level it should be adjusted to.

27. R3 discloses the process for the preparation of an active ferment. Since the activation of the ferment is an anaerobic process in which the ferment (starter culture) proliferate in the medium, it is clear that R3 is teaching of a fermentation process. R3 discloses that one utilizes, advantageously, a gas which does not interfere in respiration or oxidation of microorganisms. This gas is chemically and biologically inert. The gas is preferably argon and particularly nitrogen or carbon dioxide. (Page 9, lines 25-30). R3 discloses that the gas pressure is 1-5 bar,

and that the medium is gasified for 0.5 to 60 minutes. In the newly available document US 2003/0096037 please refer to paragraphs 0078, 0079 and 0082.

28. Given that the medium is gasified for the duration disclosed by R3, it is clear that the dissolved oxygen concentration will be decreased to the levels as presently claimed.

29. Regarding claims 8-9, given that R1 in combination with R3 disclose method as presently claimed, it is clear that such method would intrinsically result in fermented milk with excellent smoothness and taste as presently claimed as well as hardness as presently claimed.

30. Regarding claims 10-12; it is clear that the method as disclosed by R1 and R3 would intrinsically result in fermented milk with penetration angle and hardness as presently claimed. The hardness and penetration angle, as presently claimed, are describing the textural characteristics of the yogurt product. In fact hardness and penetration angle as claimed are the results of testing certain textural characteristics of the yogurt gel. They do not add to the patentability of the invention per se.

31. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the teachings of R1 and adopt the teachings of R3 in using nitrogen to reduce the dissolved oxygen in the milk medium to accelerate the growth of the starter culture and hence reduce the incubation time as taught by R1 and as presently claimed. One would do so to benefit from processes which may be carried out on a continuous basis and having a shorter fermentation time, and to improve the overall economics of the process while using a gas such as nitrogen which does not affect organoleptic properties of the product. Absent any evidence to contrary and based on the combined teachings of the cited references, there would be a

reasonable expectation of success in making a fermented product using nitrogen gas for displacing dissolved oxygen from the fermentation medium.

(10) New grounds of rejection.

32. Claims 5-6, 8-12, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Castberg et al. (US 5,453,286; hereinafter R1) in view of Kamiya (EP 1 082 907; hereinafter R2) as summarized above.

33. Claims 5-6, 8-12, 14 and 15 are also rejected further in view of Holland, K. T. et al. Tertiary Level Biology; Anearobic Bacteria. Chapman & Hall, New York. 1987; and Badr, H. R. et al. 2001. Continuous acetone-ethanol-butanol fermentation by immobilized cells of *Clostridium acetobutylicum*. Biomass and Bioenergy. 20:119-132. These references are evidentiary references.

Holland et al. disclose that the concept of lowered redox potential has long been used as an indication of the deoxygenation of growth media. This is done by the use of indicator dyes, methylene blue and resazurin being the most used. With methylene blue for example at pH 7 and 37C a redox potential value of -28mV corresponds to a 95% reduction of the blue oxidized form; the absence of any apparent color should ensure that a value below this has been attained, and in normal circumstances this indicates successful removal of oxygen (page 11, lines 16-22). They further disclose that oxygen free gas is then used to displace oxygen from empty vessels, pipettes, and syringes as well as vessels containing media with and without microorganisms. Since the oxygen removal is by displacement, carbon dioxide is most suitable because of its high density. However, constant flushing of media with carbon dioxide can affect pH; when carbon dioxide is unsuitable, nitrogen or argon with a small content of hydrogen and carbon dioxide, is

used. Argon although expensive, is recommended because it is denser than air and is inert. (page 50, lines 20-27). Therefore, replacement of carbon dioxide in the method of Castberg (R1) would have been motivated and obvious.

34. Badr et al. also disclose that flasks (SYCC and GYCC) are kept anaerobically (sparged with oxygen free nitrogen gas after filtering through electrically heated copper tubing". Therefore, sparging culture media with an inert gas such as nitrogen was known as a routine procedure to reduce the dissolved oxygen concentration (by gas displacement) in culture media used for the cultivation of anaerobic bacteria. (page 121, first column under 2.2 Growth conditions, at lines 6-10). Since yogurt is the result of the fermentation of milk by anaerobic bacteria, using nitrogen to displace and remove oxygen from milk was motivated and obvious at the time of the invention.

35. Claims 5-6, 8-12, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Castberg et al. (US 5,453,286; hereinafter R1) in view of WO-0224870 (Examiner's Translation, hereinafter R3; English equivalent of this document is US 2003/0096037A1 which became available at the writing of this script) as summarized above.

36. Claims 5-6, 8-12, 14 and 15 are also rejected further in view of Holland, K. T. et al. Tertiary Level Biology; Anearobic Bacteria. Chapman & Hall, New York. 1987; and Badr, H. R. et al. 2001. Continuous acetone-ethanol-butanol fermentation by immobilized cells of *Clostridium acetobutylicum*. Biomass and Bioenergy. 20:119-132. These references are evidentiary references.

Holland et al. disclose that the concept of lowered redox potential has long been used as an indication of the deoxygenation of growth media. This is done by the use of indicator dyes,

methylene blue and resazurin being the most used. With methylene blue for example at pH 7 and 37C a redox potential value of -28mV corresponds to a 95% reduction of the blue oxidized form; the absence of any apparent color should ensure that a value below this has been attained, and in normal circumstances this indicates successful removal of oxygen (page 11, lines 16-22). They further disclose that oxygen free gas is then used to displace oxygen from empty vessels, pipettes, and syringes as well as vessels containing media with and without microorganisms. Since the oxygen removal is by displacement, carbon dioxide is most suitable because of its high density. However, constant flushing of media with carbon dioxide can affect pH; when carbon dioxide is unsuitable, nitrogen or argon with a small content of hydrogen and carbon dioxide, is used. Argon although expensive, is recommended because it is denser than air and is inert. (page 50, lines 20-27). Therefore, replacement of carbon dioxide in the method of Castberg (R1) would have been motivated and obvious.

37. Badr et al. also disclose that flasks (SYCC and GYCC) are kept anaerobically (sparged with oxygen free nitrogen gas after filtering through electrically heated copper tubing". Therefore, sparging culture media with an inert gas such as nitrogen was known as a routine procedure to reduce the dissolved oxygen concentration (by gas displacement) in culture media used for the cultivation of anaerobic bacteria. (page 121, first column under 2.2 Growth conditions, at lines 6-10). Since yogurt is the result of the fermentation of milk by anaerobic bacteria, using nitrogen to displace and remove oxygen from milk was motivated and obvious at the time of the invention.

(11) Response to Arguments

1. Appellants argue that there is no objective reason to combine the teachings of Castberg (R1) and Kamiya (R2) to modify the process of R1, because such modification of R1 would render the invention of R1 being modified unsatisfactory for its intended use.

a. The replacement of carbon dioxide with nitrogen gas, in the process of R1, will not make the process of R1 unsatisfactory for its intended use because both gases have the property of removing oxygen through displacement and removal of oxygen from the fermentation medium. It is clearly stated by R1 that carbon dioxide is intrinsically displacing and removing oxygen from the fermentation medium. This role of carbon dioxide will make the fermentation medium more anaerobic which will favor the proliferation of yogurt bacteria. Therefore, it is clear that nitrogen gas, known in the art for its property of displacing and removing oxygen, will perform the same function of oxygen removal through displacement of this gas. The more anaerobic conditions created by removal of oxygen will favor yogurt bacterial proliferation resulting in a satisfactory product.

2. Appellants argue that what Castberg (R1) teaches is not to reduce oxygen gas concentration, but add and maintain carbon dioxide gas consistently throughout the fermentation process.

a. Attention is drawn to Castberg at col. 4 lines 38-42 which recites "We have found that the presence of carbon dioxide in the milk stimulates the growth of yoghurt bacteria. This is probably a combined effect of removal of oxygen from the milk and thus lowering the redox potential, and a direct stimulation of the yoghurt bacteria by the carbon dioxide". Castberg further adds that high oxygen content (i.e. milk) retards the growth of yoghurt bacteria. (col. 4, lines 48-50)

It is then clear that Castberg is teaching of removing dissolved oxygen from the medium (to be fermented) which will accelerate the growth of yogurt bacteria. Low redox potential (also known as oxidation-reduction potential) in a medium means that the concentration of dissolved oxygen has been reduced. Further, the concept of lowered redox potential has long been used as an indication of the deoxygenation of growth media. This is done by the use of indicator dyes, methylene blue and resazurin being the most used. With methylene blue for example at pH 7 and 37C a redox potential value of -28mV corresponds to a 95% reduction of the blue oxidized form; the absence of any apparent color should ensure that a value below this has been attained, and in normal circumstances this indicates successful removal of oxygen (Holland, K. T. et al. Tertiary Level Biology; Anearobic Bacteria. Chapman & Hall, New York. 1987. page 11, lines 16-22). Since the yogurt bacteria are anaerobic bacteria and sensitive to the presence of oxygen, the removal of dissolved oxygen from the medium, with the concomitant lowering of redox potential, will be expected to help these bacteria grow more quickly and in abundance as compared to a medium in which dissolved oxygen has not been reduced. That is why Castberg (R1, col. 4, lines 29-31) clearly states that "An advantage of the present invention is that it can shorten the fermentation time necessary and can thus lead to economies in the manufacture of the fermented milk…". Attention is also drawn to claim 6 of the instant application which recites, in part, "wherein the period of carrying out fermentation is shorter.....". This limitation is clearly disclosed by Castberg.

It is further noted that sparging (bubbling an inert gas in a liquid culture medium to remove/reduce dissolved oxygen) the culture medium using an inert gas such as nitrogen is a routine practice in laboratories where anaerobic bacteria are conventionally grown. Appellants

are referred to one of the Examiner's publications (Badr, H. R. et al. 2001. Continuous acetone-ethanol-butanol fermentation by immobilized cells of *Clostridium acetobutylicum*. Biomass and Bioenergy. 20:119-132). At page 121, first column under 2.2 Growth conditions, at lines 6-10 it is recited "All flasks (SYCC and GYCC) were kept anaerobically (sparged with oxygen free nitrogen gas after filtering through electrically heated copper tubing". Therefore, sparging culture media with an inert gas such as nitrogen was known as a routine procedure to reduce the dissolved oxygen concentration (by gas displacement) in culture media used for the cultivation of anaerobic bacteria. Since the process of making yogurt is in fact the cultivation of yogurt bacteria under anaerobic conditions, removal of dissolved oxygen from the culture medium (e. g. milk to be fermented to yogurt) is expected to help the growth and the proliferation of these bacteria and hence a reduction in the fermentation time. It is therefore the Examiner's position that replacing carbon dioxide gas with nitrogen gas is not an inventive step.

3. Appellants argue that one skilled in the art would not have been motivated to remove carbon dioxide from process of R1 and replace carbon dioxide with other gases, because the process of R1 specifically requires the continuous presence of saturated carbon dioxide gas in the milk during fermentation.

a. Attention is drawn to Castberg at col. 6, lines 1-3 where it recites "CO2 gas was sparged into the milk at 12 C through gas distribution nozzles in the bottom of one of the two containers." Then at lines 15-17 it recites "The containers were closed with aluminum foil, and therefore not airtight during fermentation." Therefore, it is clear that conditions for saturation of carbon dioxide, as alleged by Appellants, are not practiced by R1 because sparging is done while the gas evolves from the medium and the fermentation containers are not airtight during

fermentation therefore, carbon dioxide is not saturated; despite the belief of appellants. It is, however, noted that due to the solubility of carbon dioxide in aqueous media, some residual carbon dioxide will linger around in the medium depending on the temperature and pressure at which the system is maintained. That is why Castberg (col. 6, lines 29-30) states that " The rising of the temperature from 12C to 42C caused this content to decrease to 1033 ppm".

It is also noted that depending on the temperature of the medium and the duration of gasification by carbon dioxide; the amount of dissolved carbon dioxide in the medium can alter the pH of the medium and potentially the flavor of a medium such as milk. This is clearly a motivation for those of skill in the art to replace carbon dioxide with another gas such as nitrogen which can displace dissolved oxygen in the medium, yet not leaving any after taste or pH change.

As supporting evidence for the above statements, attention is drawn to a passage from Holland, K. T. et al. 1987. Page 50, lines 20-27.

"Oxygen free gas is then used to displace oxygen from empty vessels, pipettes, and syringes as well as vessels containing media with and without microorganisms. Since the oxygen removal is by displacement, carbon dioxide is most suitable because of its high density. However, constant flushing of media with carbon dioxide can affect pH; when carbon dioxide is unsuitable, nitrogen or argon with a small content of hydrogen and carbon dioxide, is used. Argon although expensive, is recommended because it is denser than air and is inert."

It is therefore clear that replacement of carbon dioxide with nitrogen or argon in the method of R1 is motivated and obvious.

4. Appellants argue that the problems to be solved and the solutions provided by Castberg (R1) and Kamiya (R2) are different, there no objective reason to combine the teachings of R1 and R2.

a. R1 clearly discloses that sparging the fermentation medium with carbon dioxide will remove oxygen from the fermentation medium (i.e. milk) causing a better growth and resulting in a shorter fermentation time. It is the Examiner's position that limitations of claims 5 and 6, in part, in the instant application are implied by R1 disclosure.

R2 clearly teaches of reducing the dissolved oxygen in milk by using nitrogen gas. Therefore removal of dissolved oxygen from milk was a known gas displacement technique in the art at the time the invention was made.

appellants are reminded that according to MPEP 2141.01 (a), a reference may be relied on as a basis for rejection of an applicants' invention if it is "reasonably pertinent to the particular problem with which the inventor is concerned." A reasonably pertinent reference is further described as one which "even though it maybe in a different field of endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem." R2 is, therefore, a reasonably pertinent reference, because it teaches how to reduce the dissolved oxygen in milk from 10 ppm, normally present in milk, to about 2ppm using nitrogen gas, which is a function especially pertinent to the invention at hand.

5. Appellants argue that the Examiner's assertion that the method as disclosed by R1 and R2 would intrinsically result in fermented milk with the penetration angle and hardness as presently claimed, lacks merit.

a. The penetration angle, the angle at which the knife penetrates the yogurt gel, is one of the ways to express the textural properties of the product. It does not add to the patentability of the method or the product. R1 discloses the hardness concept in Example II (col. 7). R1 discloses that the viscosity was slightly higher in the CO2 treated yoghurt than in the control. However, it should be realized that hardness and textural properties in fermented yogurt depends on a few factors among which the milk solids and presence of hydrocolloid stabilizers are very important. It is also acknowledged that abundant growth of yogurt bacteria due to favorable growth conditions will also affect the firmness of the gel. The assumption, by the Appellants, that the increased hardness of their product is only due to sparging milk medium with nitrogen is not accurate. Nitrogen is an inert gas. It does not react with any medium components. As a gas it is not consumed by yogurt bacteria. Its role in the claimed fermentation process is only displacing dissolved oxygen in the medium.

6. Appellants argue that WO-02248470 (R3) does not make up for the noted deficiency of Castberg (R1); Because R3 is silent as to dissolved oxygen concentration as recited in instant claim 5.

a. The correct number of this reference is WO-0224870 (R3). The English equivalent of this reference is US 20030096037A1.

Appellants assert that R3 is directed to a ferment activator based on lactic acid bacteria and method of preparing a dairy product using such activator. Appellants go on saying that the ferment activator comprises a nitrogenous substance and a buffer capable of maintaining the activity of pH of the lactic acid bacteria.

The information quoted by Appellants is the abstract of R3. R3 is generally concerned with activation of lactic acid bacteria. For activating lactic acid bacteria (the ferment); R3 uses an activator and also teaches of an activation method comprising using an inert gas. R3 (US 2003/0096037) teaches of using a gas which is not involved in biological activities of the microorganisms (lactic acid bacteria) such as respiration and oxidation (page 4, paragraph 0078). R3 then teaches that the injected gas is chemically and biologically inert gas, preferably argon, more preferably nitrogen or carbon dioxide (page 4, paragraph 0079). R3 also teaches of injecting the gas over a time interval. The gas is injected under pressure over a time interval of between 0.5 minutes and 60 minutes (page 4, paragraph 0082). It is the Examiner's position that the activation of the ferments (lactic bacteria) as taught by R3 is a fermentation process in which nitrogen gas is being used and that the dissolved oxygen is reduced for that matter.

It should be realized that while R3 does not mention the phrase "dissolved oxygen", however sparging nitrogen or argon or carbon dioxide, as taught by R3, through a medium for the duration disclosed by R3 will certainly reduce the dissolved oxygen concentration in the medium to levels as presently claimed. R3 is a secondary teaching reference disclosing that inert gases such as nitrogen, argon and carbon dioxide can be used in the cultivation of lactic acid bacteria. Since making yogurt is in fact the cultivation of yogurt bacteria, R3 is clearly solving the problem with which the appellants were concerned.

Going back to the teachings of Castberg (R1), it is clear that the concept of reducing dissolved oxygen is disclosed through introducing lowering redox potential (also known as oxidation-reduction potential) of the medium. It is also noted that the decrease in redox potential, as disclosed by R1, is indicative of a decrease in dissolved oxygen concentration as detailed above.

However, to what level the dissolved oxygen, in the culture medium e.g. the milk to be fermented to yogurt, should be reduced; is of course a matter of optimizing the conditions for the feasibility of the process. The dissolved oxygen levels as presently claimed are obtainable through sparging inert gases, as disclosed by R1 and R3, and such reduced dissolved oxygen levels are expected to reduce the fermentation time as disclosed by R1 and as presently claimed resulting in improved fermentation products. The reason for the reduced fermentation time is of course the more favorable growth conditions, due to reduced dissolved oxygen, for the anaerobic lactic acid bacteria used in fermented milks e.g. yogurt.
It is the Examiner's position that replacing carbon dioxide with nitrogen gas in a fermentation process as disclosed by R1 does not constitute an inventive step.

(12) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section **(9)** above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

A Technology Center Director or designee must personally approve the new ground(s) of rejection set forth in section (9) above by signing below:

/Christine Tierney/

Supervisory Patent Examiner, Art Unit 1700

Technology Center Director designee

Respectfully submitted,

Hamid R. Badr, Ph.D.

Examiner, Art Unit 1781

/Hamid R Badr/

/Keith D. Hendricks/
Supervisory Patent Examiner, Art Unit 1781

/Christine Tierney/
Supervisory Patent Examiner, Art Unit 1700